COST AND BENEFITS OF CZECH ECONOMIC TRANSFORMATION: MACROECONOMIC APPROACH

Adam KUČERA and Aleš MARŠÁL[1]
Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague, Prague/Czech Republic
avtkucera@gmail.com, ales.marsal@gmail.com

Abstract
The paper evaluates costs and benefits related to the transformation of the Czech economy. As an alternative approach to the frequently used accounting-based view, a macroeconomic method is utilized which identifies costs and benefits of the transformation in its impact on the domestic product growth rate. The analysis itself follows econometric estimates of relationships between the growth rate of an economy and an occurrence of a transition reform. These estimates, which are gathered from the relevant literature, are then applied to the Czech case, which allows obtaining explicit values of costs and benefits related to the transformation process. Results show that, in the short run, the transformation brought costs of hundreds billion Czech Koruna (CZK), measured in the 2005 price level. The total costs are estimated in the range 3300-3400 billion CZK. Nevertheless, the total result of the economic transformation is found to be positive – especially a quick external liberalization of the country reveals to be the most beneficial aspect of the transformation. Contrary, the largest costs are related to the large-scale privatization and the financial sector reforms.

Keywords
Czech Republic; Economic Transition; Liberalization; Privatization

---

[1] The present paper was presented at the International Student Conference "V4 and Romania: 25 years since the fall of communism" (26-27 March 2015, Bucharest, Romania). The event took place with the support of the International Visegrad Fund

1. INTRODUCTION

Leaving the planned economy system and its transformation into a market economy system is a gradual, costly, and in a certain extent always new and unprecedented process. Its method as well as its success rate have impact on the next decades of economic development in the country; for this reason, analysing the economic transition is frequent in the literature. Studies are often aiming at the most optimal method of transformation. They usually compare jump-transition, related to short-term huge drop in the economic product due to the collapse of prevailing economic structures, but also fast recovery and gradual transition, trying to conduct the transition without negative impact on the growth rate, which can make the transformation process slower and often also less effective. For example, Pickel (1992) evaluating East German transition process, Kolodko and Nuti (1997) focusing the Polish economic transformation, or Hanousek and Krkoška (1997) analysing the Czech transition.

Costs and benefits of the transition can be examined from either accounting or macroeconomic point of view. The latter frequently estimates the transformation results based on the growth regression, when econometric methods are used to evaluate impact of single reform steps on the economic growth, both in short and long horizon. The models are often specified as panel regression over a large group of transformation countries, which is well described and utilized in the meta-analysis of Babecký and Havránek (2013), as will be discussed in the further text. The macroeconomic approach is what the article is concerned with, especially its application for the Czech case. It is the application of the results of econometric methods on a specific economy and resulting explicit estimation of costs and benefits of the transformation for the country, which makes the analysis into certain extent unique and pioneering. Such explicit formulation of results of transformation for the economy as a whole is not known to the authors.

Utilizing the large number of studies examining the transition impact on the economic activity, the study builds on already existing models and estimations, instead of deriving a new model. More specifically, the paper uses econometric estimates of the relationship between the economic growth and the transformation reforms existence, available in the relevant literature, to estimate explicitly results of the Czech transformation, both in the relative and

absolute values. The particular econometric approaches used in the literature are considerably variable, as a result of different methods and estimation horizons used. Consequently, the paper is based on multiple studies simultaneously to enhance robustness of its results. All the included models are described in the further text and follow the same logic: they use transformation indices of European Bank for Reconstruction and Development (EBRD), and based on them, they estimate regression coefficients of a dependence of the gross domestic product growth rate on the existence and intensity of the reforms. Nevertheless, the different models still offer different point of views. Babecký and Havránek (2013) perform wide meta-analysis of the literature, and based on it, they estimate both short- and long-term positive impact of the reforms on the economic growth. Lawson and Wang (2004) focus on the negative impact, only, but are able to split the costs between the specific reform fields. Staehr (2005) uses the principal components method to modify the interpretation of EBRD indices, and is consequently able to differentiate the impact of the transformation process itself and specific impact of the reform steps timing. Finally, Radulescu and Barlow (2002) include lagged indices values in the model, which allows splitting the immediate and long-term effects of the transformation.

The paper is expected to offer a contribution into the discussion about the aggregate level of costs and benefits related to the transformation reforms in the Czech Republic. Contrary, it does not aim at specific aspects of the transformation related to the impact of the monetary and fiscal policy or the microeconomic aspects of the transformation, which are left for further research.

The paper is organized as follows: the second chapter presents accounting and macroeconomic approaches, the motivation to use each of them, and offers first illustration of the costs and benefits of the transformation. The third chapter describes the chosen econometric analyses. It describes their approach, methodology, and most importantly the results, values of the estimated regression coefficients. The following fourth chapter applies these outcomes to the case of Czech transformation, which provides macroeconomic estimates of costs and benefits of the reforms. The last chapter concludes.

2. MOTIVATION: ACCOUNTING AND ECONOMIC APPROACH

The chapter offers first insight into the costs and benefits of the economic transformation in the Czech Republic using two different approaches, accounting and macroeconomic.

The accounting approach is prevailing in the literature focused on the Czech economic transformation. This approach usually restricts the costs and benefits to the programmes and policies of the public sector, in forms of subsidies to the transformed enterprises. The term "accounting" reflects the fact that the costs are taken directly from the profit and loss statements of the public subjects – transformation institutions, mostly Czech Consolidation Agency, Czech Financial, National Property Fund and other. For this reason, the papers using this approach usually evaluate the costs, but are not explicit in terms of benefits – some of the interesting analyses include Kreuzbergová (2003), Mertlík (1998) or MF (2005). Case studies examining subsidies to single enterprises then offer for example Čermák (2002), Dvořák (1997) or Neprašová (2000). The total costs of the transformation institutions are usually estimated around 500-600 billion CZK (MF 2005).

The macroeconomic (or economic) approach is based on the dependency of the economic performance of a country on the extent and method of its transformation. The first look at the Czech real GDP time series (see the Figure 1; logarithmic values are used, in terms of international dollars) shows a huge drop of the product value in the first years of transformation; since the beginning in 1990 until 1994, when a strong economic growth started, reflecting the first positive impact of the transformation. However, in May 1997, the growth rate was temporarily decreased by a currency crisis – the following recovery was slower. Distinct growth appeared in 2004, when the transformation was into large extent finished: in 2007, the Czech Republic successfully graduated from the EBRD transformation programme.

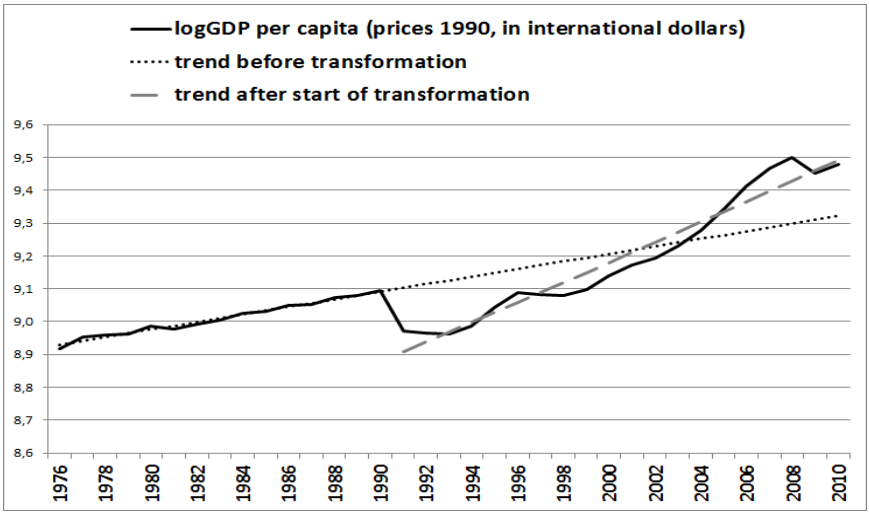

Figure 1. GDP Development in the Czech Republic (1976-2010)
Source: data - Bolt and Zanden (2013), own calculation

The costs of transformation can be identified in the temporary loss of the domestic product. As obvious from the graphics, as compared to the simply-modelled trend before the transformation, the actual GDP was below the trend in the period 1993-2003. However, the long-term impact of the transformation was positive as the new growth rate (on average 3.05% per year) is almost 2 percentage points higher than the original (1.15% p.a.). In absolute values (in the prices of 2005), the drop of GDP in 1991 (measured simply as the difference between GDP value in 1990 and 1991) was more than 300 billion CZK. The total accumulated loss of the product until 2003 equals to 2855 billion CZK, measured as a cumulative sum of differences between the extrapolation of the original GDP trend and the reality each year. If measured as a difference of the original and new trend (again calculated by authors as linear, in this case interpolating the GDP values each year), the loss is even higher – 3318 billion CZK.

However, since 2003, the product overcame the extrapolated value of the planned economy, and the total net loss started to decrease. From this point of view, the transformation costs were fully repaid in 2010, when some

of the positive increments of the product since 2003 was first higher than the accumulated loss.

These calculations based on the GDP time series and basic trend estimations offer an illustration of the real impact of the transformation on the economic prosperity of the country, and show the levels in which the costs and benefits of the transformations can be expected. In further chapters, the transformation costs will be estimated based on more advanced econometric methods, which will also allow differing the costs by various transformation fields.

3. GLOBAL ANALYSIS

In this chapter, first a general approach to the estimation of the impact of the transformation growth on the economic growth is described. Afterwards, there are described the chosen econometric analyses – approach, methodology, and most importantly the results, as values of the estimated regression coefficients. Four studies are presented. Their outcomes will be used to evaluate the Czech transformation process in the next chapter.

3.1. General Method

Quantitative estimates of the relationship of reforms growth are in the literature very variable, depending on the definition of reforms, methods of measurement their impact, definition of costs themselves, and used econometric technique as well as the data source. One of the approaches, which also the paper follows, is based on: (i) exact definition of the moment of reform, (ii) definition of costs and benefits of the transformation in terms of its impact on the economic growth, (iii) estimation of the model based on panel data resulting from wide group of transition economies, (iv) differentiate the impact according to the transformation fields.

The studies following this approach usually utilize transformation indices, usually EBRD indices. These are forming 11-degrees scale, ranging from 1 to 4+, with 4 major degrees (1,2,3,4) and two sub-degrees to each of them (for example 2- and 2+ or 1.67 and 2.33 in decimals). The lowest value (1) represents unreformed fields with remaining planned economy structures; the

highest value (4+) is used for the finished transformation in the field, which becomes very similar to the situation in typical market economies. The classification of the transformation fields, according to the EBRD, is presented in Table 1 (EBRD 2007):

Table no 1. Classification of Transformation Fields According to EBRD

Field	Sub-fields	Abbrev.
Private Sector/GDP ration		
Enterprises	Large-Scale Privatization	LP
	Small-Scale Privatization	SP
	Governance and Enterprise Restructuring	ER
Markets and Trade	Price Liberalization	PL
	Trade & Foreign Exchange System (external liberalization)	EL
	Competition Policy	CP
Financial Institutions	Banking Reform and Interest Rate Liberalization	BS
	Securities Markets & Non-Bank Financial Institutions	FI
Infrastructure		

Source: EBRD (2007)

Costs related to the Infrastructure field can be interpreted as costs of the last policy regime, which neglected this area, rather than transformation costs – for this reason, they are excluded from the further analysis, similarly to other papers utilizing EBRD indices. Private Sector/GDP ratio is then a result of other transformation steps; this category will be excluded as well. The difference between the large-scale and small-scale privatization lies in both the size of the privatized enterprises and the privatization methods used in each case.

The econometric model itself is established as one-equation growth regression, with the annual economic growth rate $r_{i,t}$ of the country i in time t, expressed in percentages, as the explained variable. The explanatory variables are the reforms represented by the EBRD indices – either their level at time t ($I_{i,t}$), lagged value ($I_{i,t-1}$) or annual change ($\Delta I_{i,t}$). Explanatory variables are extended by control variables $X_{i,t}$, which allow to estimate the model based on the panel of transformation countries. The last element is the error term $u_{i,t}$. The model can be written as:

$$r_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_{2,1} I_{i,t} + \beta_{2,2} I_{i,t-1} + u_{i,t}$$

Where $r_{i,t}$, β_0 and $u_{i,t}$ are scalars, β_1 is *1xm* vector of regression coefficients related to the *mx1* vector of control variables $X_{i,t}$, $\beta_{2,1}$ and $\beta_{2,2}$ are *1x8* vectors related to the vectors of current and lagged indices. In case $\beta_{2,1} = -\beta_{2,2}$, the growth rate depends on the change of the indices, only; in case $\beta_{2,1}=0$ or $\beta_{2,2}=0$, the growth rate depends purely on the current (or lagged) level of indices; in other cases, it is a combination of both.

The paper is not intended to estimate a new model, but to utilize the already estimated models. The already known values of $\beta_{2,1}$ and $\beta_{2,2}$, taken from the relevant literature, will be used to calculate the impact of the transformation reforms on the Czech economic growth. For this reason, it is unnecessary to discuss further the control variables, although their choice has important impact on the results of the followed papers.

3.2. Detailed Description of Chosen Analyses

Wide analysis of the outcomes of the relevant literature performs Babecký and Havránek (2013). Authors utilize the fact that a large number of growth regression based models has already been estimated. Using meta-analytic methods (whose description is beyond the extent of this paper; some fundaments of the approach are shown, for example, in Stanley 2001), the authors summarize results of 60 papers dealing with the impact of the transition reforms on the economic growth. Authors show that, on average, the correlation between existence of a reform and the growth is negative in the short horizon, but positive in the long one. Authors conclude that a "standardized reform", defined as 13% growth of the total EBRD index, results in a short-term decrease of growth rate by 0.4 percentage points, but also an increase of the long-term performance by 0.3 percentage points. Authors also point out the positive impact of the external liberalization, related to short-term negative impact by 20% lower, and long-term effect by 40% higher, than the other transformation fields. Strength of the paper is in the number of the underlying papers – on the other hand, the result are very general, using only the total EBRD index, not differenced the results by the specific fields (except for the mentioned impact of the external liberalisation).

More detailed analysis offer Lawson and Wang (2004), who examine in detail the impact of reforms in the single transformation fields on the growth, but only in the short and medium term (in period 1991-2000). Authors focus on impact of both the level of indices ($I_{i,t}$) and their change ($\Delta I_{i,t}$). The conclusion is that the overall impact in such shorter period is negative. From the values of the regression coefficients, which are statistically significant, is obvious, that in the shortest horizon, the biggest losses of the product are related to the small-scale privatization (temporary drop of GDP growth by 4 percentage points) and most of all to the price liberalization (-6.7 p.p.). More persistent negative impacts then bear the large-scale privatisation (-2.68 p.p.) and the competition policy reforms (-3.76 p.p.). Contrary, the positive impact is related to the external liberalization (+2.86 p.p.).

Staehr (2005) offers a similar analysis. The author however improves the analysis by using the principal component analysis, which is a multidimensional statistical method to transform the original variables (EBRD indices) orthogonally to obtain new, artificial variables. These new variables, principal components, are uncorrelated, which allow to differentiate the impact of the overall reform process and its specific features. The principal components are given following explanation (only those which the author finds as with meaningful interpretation):

i. First principal component represents the overall reform process in the country, and is approximately equal to one third of the total EBRD index (sum of all indices values). This component explains around 80% of all variability of indices;
ii. The second component is correlated positively with reforms regarding liberalization, both external and internal, but without the existing reforms – and is hence called as "early liberalization";
iii. The sixth principal component can be interpreted as a sign of the large-scale privatization preceding the small-scale privatization;
iv. The seventh component reflects the external liberalization reforms without existing enterprise restructuring and privatization;
v. The eighth component is interpreted as the reforms of financial sector, but again without the reforms of the private sector.

The first two components are related to the reform process itself, either overall or the specific impact of the early liberalization. The remaining components then reflect impact of the imperfect reform timing. The

components enter the regression instead of the original variables – again in the form of both levels and changes. Estimation results show, that the overall reforms impact the growth rate negatively in the following year (-1.34 p.p. of annual economic growth), but positively afterwards (+0.73 p.p.). The second component – the early liberalization – impacts the growth similarly (-1.43 p.p. next year, +2.56 p.p. afterwards). On the other hand, the imperfect timing has a negative impact in all cases, for all the years it is present: -2.97 p.p. for the privatizations wrong timing, -1.42 p.p. for the external liberalization without reformed enterprises, -1.70 p.p. for too premature financial sector reform.

The last study followed in the paper is the analysis of Radulescu and Barlow (2002). Authors again split the impact according to the specific transformation fields, and include both current and lagged values of indices into the regression, which can be simply modified to evaluate the impact of levels of indices and of their changes separately:

$$b_1 i_t + b_2 i_{t-1} = b_1 i_t + (b_2 - b_1 + b_1) i_{t-1} = b_1 (i_t - i_{t-1}) + (b_1 + b_2) i_{t-1} = b_1 \Delta i_t + (b_1 + b_2) i_{t-1}$$

The signs of the estimated coefficients are in line with the other models. The impact of the change of indices $\Delta I_{i,t}$, i.e. the short-term impact of reforms, is most negative for price liberalization (-4.85 p.p.), enterprise restructuring (-1.41 p.p.), competition policy (-1.3 p.p.) and privatization, both large- and small-scale. In contrast, even the short term impact is positive for the external liberalization (+0.95 p.p.), and also for the non-bank institutions reforms (+0.56 p.p.). The impact of the lagged level of the indices $I_{i,t-1}$, i.e. the long-term results of reforms, is positive for price liberalisation (+0.48 p.p.) as well as for external liberalization (+1.13 p.p.), small-scale privatization (+1.71 p.p.) and above all for the enterprise (+4.14 p.p.). However, according to the paper, there were also fields for which the negative impact remains persistent: large-scale privatization (-2.43 p.p.), competition policy (-1.09 p.p.), and most of all the banking sector reforms (-2.55 p.p.). This negative impact may be the result of the rather short horizon of the analysis – it can be assumed that in further periods, the long-term impact would also become gradually positive for these fields.

As a summary of the third chapter, it is useful to highlight the purpose of presented revision of the literature. Unlike a meta-analysis, which would continue by synthesizing the results of the models into a general conclusion,

the paper is built as an applied study. The estimates of impact of the transformation reforms, as provided by the individual models described above, will be in the next chapter applied directly to the Czech economic reality, and based on them, an explicit evaluation of the impact of the transition costs and benefits will be obtained.

4. ECONOMIC TRANSFORMATON IN THE CZECH REPUBLIC

After a short revision of the literature, application of their outputs on the Czech case follows in this chapter. Firstly, development of the EBRD indices for the Czech Republic in the period 1990-2007 is described; afterwards, based on the values of regression coefficients described above, the estimation of the impact of the Czech reforms on the growth rate is made. Further, based on these estimates and values of the Czech GDP, the absolute values of costs and benefits of the transformations are obtained. Finally, the results are commented on and compared across the individual models.

The construction of the EBRD transformation indices, as well as the split into particular categories, is described into detail in the chapter 3.1. Historical values of the EBRD indices for the Czech Republic are summarized by the Table 2:

Table no 2. EBRD Indices for the Czech Republic

year	PL	EL	SP	LP	ER	CP	BS	FI	total
1990	1	1	1	1	1	1	1	1	8
1991	4	3	3	1	2	2	2	1	18
1992	4	4	4	2	2	2	3	1	22
1993	4	4	4	3	3	2.67	3	2	25.67
1994	4	4	4	4	3	2.67	3	2.67	27.33
1995	4	4	4	4	3	2.67	3	2.67	27.33
1996	4	4.33	4.33	4	3	2.67	3	2.67	28
1997	4.33	4.33	4.33	4	3	2.67	3	2.67	28.33
1998	4.33	4.33	4.33	4	3	2.67	3	3	28.67
1999	4.33	4.33	4.33	4	3	2.67	3.33	3	29
2000	4.33	4.33	4.33	4	3.33	2.67	3.33	3	29.33
2001	4.33	4.33	4.33	4	3.33	2.67	3.67	3	29.67
2002	4.33	4.33	4.33	4	3.33	3	3.67	3	30
2003	4.33	4.33	4.33	4	3.33	3	3.67	3	30
2004	4.33	4.33	4.33	4	3.33	3	3.67	3.33	30.33

2005	4.33	4.33	4.33	4	3.33	3	4	3.67	31
2006	4.33	4.33	4.33	4	3.33	3	4	3.67	31
2007	4.33	4.33	4.33	4	3.33	3	4	3.67	31

Source: Fosu (2013), EBRD (2014). Detailed information about the indices is provided in the chapter 3.1.

This table can be read as follows: At the beginning of the transformation, all the indices were at the lowest value 1. During two years, the liberalization (both price and external) was finished, together with the small-scale privatization: in 1992, all these fields had the indices equal to 4. Large-scale privatisation was slower, but still quite fast, with the index reaching level 4 in 1994. Contrary to this and less successful, in terms of both speed of the reforms and the final value in 2007, was enterprise restructuring and competition policy reforms. Similarly, the financial system reforms were slow, but accomplished to a greater extent in 2007.

By plugging these indices values into the growth regression equations (in restricted forms, i.e. in fact only multiplying the indices levels and changes by the regression coefficients), the estimates of the impact of reforms on the growth rate are obtained (in percentage points). It is necessary to note, that the analysis is not dealing with explain the growth rate in each year, being focused only to its component related to the transformation. Afterwards, by multiplying by the absolute GDP values, the absolute amount of costs/benefits of the transformation is obtained.

More specifically, our own calculations of the estimates of the absolute values of costs and benefits of the transformations are done in several steps: (i) for each year and each transformation field, actual value and/or change of the particular transformation index is considered as the exogenous variable; (ii) this variable is pre-multiplied by the estimate of the impact of level and/or growth of the index on the domestic product growth rate – the estimates are directly taken from the already existing models described in detail in the chapter 3; (iii) the relative product growth rate is then multiplied by the actual absolute value of the GDP, one year lagged, in constant prices, resulting in the estimation of the absolute value of costs/benefits related to the particular transformation area in the particular year; (iv) finally, summing these values over years or the transformation areas, the aggregate impacts of the transformation are obtained.

Based on this methodology, all four models described above are applied to the Czech transformation process. Results of the calculations are

included in the Tables 3-6, and summarized in the Table 7 below. First, the application of the model Babecký and Havránek (2013) for the Czech case presents the Table 3:

Table no 3. Transformation Results: Model Babecký and Havránek (2013)

year	PL	EL	SP	LP	ER	CP	BS	FI	total
1991	-29.04	-15.49	-19.36		-9.68	-9.68	-9.68		-92.93
1992		-2.99	-3.85	-3.85			-3.85		-14.55
1993				-3.19	-3.19	-2.13		-3.19	-11.7
1994				-2.56				-1.7	-4.26
1995									
1996		-0.70	-0.93						-1.63
1997	-0.97								-0.97
1998								-0.97	-0.97
1999							-0.96		-0.96
2000					-0.98				-0.98
2001							-1.02		-1.02
2002						-1.05			-1.05
2003									
2004								-1.11	-1.11
2005							-0.88	-1.17	-2.04
2006									
2007									
total	-30.01	-19.18	-24.14	-9.6	-13.85	-12.86	-16.39	-8.14	-134.17

Source: Own Calculations. Values in billion CZK (this applies also to the other tables, if not stated otherwise).

The total costs of transformation are estimated at 134 billion CZ (in prices 2005). Contrary, including the positive impact 0.3 p.p. per each 13%-growth of the total indices, the total net result of the transformation is strictly positive: 1668 billion CZK (during the years 1990-2007). Since 2007, the relative positive impact of the transformation on the growth rate is 1.47 p.p. Although Table 3 differentiates the results according to the transformation fields, all of them have equal weight, and it is not meaningful to discuss the impact of these fields separately. Interesting is the distribution of costs in time: most of them are related to the very first year of transformation.

The second model, Lawson and Wang (2004), due to the restricted observed period, can be interpreted as dealing only with the costs. Their evaluation is included in Table 4:

Table no 4. Transformation Results: Model Lawson and Wang (2004)

year	PL	EL	SP	LP	ER	CP	BS+FI	Total
1991	-486	-23	-194		-55	30	-23	-753
1992		51	-108	-19			-49	-125
1993		61	-22	-76	-67	-36	-78	-218
1994		61	-22	-133	-18	-54	-90	-256
1995		63	-23	-176	-19	-55	-78	-289
1996		85	-63	-187	-20	-59	-83	-327
1997	-67	93	-33	-196	-21	-61	-87	-373
1998	-13	23	-8	-129	-21	-61	-72	-282
1999	-13	23	-8	-65			-51	-114
2000	-14	23	-8		-25		-22	-46
2001	-14	24	-9		-7		-43	-49
2002	-15				-7	-22	-35	-79
2003					-8	-33	-36	-77
2004					-8	-35	-46	-89
2005					-8	-36	-71	-116
2006						-39	-56	-95
2007						-41	-45	-86
Total	-623	482	-497	-981	-285	-503	-966	-3 372

Source: Own Calculations

As the observed horizon of the Czech Republic is longer than in the original study, the negative results of the reforms are arbitrarily restricted to six years only, which is average time from implementing the reforms to the end of the observed period in the original model. Moreover, costs of levels are compared to the situation in 1991 to ensure only the net change of the growth rate after the reforms implementation is evaluated. As compared to the previous case, the costs are distinctly higher, reaching almost 3400 billion CZK. This is, however, approximately in line with the trend analysis from the second chapter: the total loss of GDP as compared to the original trend is 2855 billion CZK and3188 billion CZK respectively for the difference of both trends.

When separating individual components of the costs, 969 billion CZK can be related to the short-term costs related to changes of indices, whereas 2403 billion CZK reflects the more persistent costs of levels. The amount of costs related to the first year is large: 753 billion CZK. In the first years, the most expensive transformation fields are price liberalization and the small-scale privatization; however, in total, the most costly fields are the large-scale privatisation (981 billion CZK) and the financial sector reform (966 billion

CZK; authors include the FI and BS fields into one). In contrast, the external liberalization is costly only in the first year, and since then it bears positive impact (+482 billion CZK).

The third model (Staehr 2005) requires first the transformation of the EBRD indices into the principal components. After obtaining the first, second and sixth to eight components, evaluation of the impacts can be done in the same way as in case of the previous models – the results captured in Table 5:

Table no 5. Transformation Results: Model Staehr (2005)

year	PC1	PC2	PC6	PC7	PC8	total
1991	-52	63	78	10	5	104
1992	35	139	82	-2	-18	236
1993	60	130	3	-2	3	194
1994	90	91	-27	-9	2	147
1995	110	81	-2	-9	2	182
1996	113	92	37	-14	4	232
1997	125	108	2	-12	4	227
1998	125	110	7	-13	5	234
1999	127	103	5	-11	-5	219
2000	131	103		-7	5	232
2001	139	105	-1	-5	-5	233
2002	146	103	11	-7	-7	246
2003	153	100	6	-7	-7	245
2004	157	98	5	-8	-7	245
2005	164	90	-2	-7	-18	227
2006	185	89	2	-8	-19	249
2007	198	95	2	-8	-20	267
total	2 006	1 700	208	-119	-76	3 719

Source: Own Calculations

Obviously, since the second year, the overall reform process (represented by the first component – PC1) yielded a positive impact on the product of the country. Similarly, the fast liberalization (PC2) was very beneficial, adding 1700 billion CZK to the total result of the transformation. Moreover, the fact that the small-scale privatisation preceded the large-scale was also evaluated by the model as positive. Contrary to this, due to slow enterprise sector restructuring, the external liberalization and financial system reforms incurred additional timing costs, together almost 200 billion CZK. When separating the results of indices changes and indices levels, the short-

term costs are estimated around 289 billion CZK, whereas the long-term positive impacts are greater than 4000 billion CZK.

The last model approach, following Radulescu and Barlow (2002), differentiates well the negative impact of changes of the indices (i.e. occurrence of the reforms) – estimated in total around 596 billion CZK – and the positive consequences of the reforms in the long term (1619 billion CZK). The total net impact is estimated to be positive: +1023 billion CZK. Most of the costs are related to the first year, 1991, when the prices were liberalized and the small-scale privatisation took place. However, since 1992, both of these fields started to yield positive impact. The external liberalization was the most positive aspect of the transformation, according to the models, and also the enterprise restructuring. In contrast, large-scale privatisation, competition policy reforms and banking sector reforms impacted the economy in a negative way. The results are included in Table 6:

Table no 6. Transformation Results: Model Radulescu and Barlow (2002)

year	PL	EL	SP	LP	ER	CP	BS	FI	total
1991	-352	46	-51	0	-34	-31	-6	0	-428
1992	31	69	50	-26	67	-23	-59	0	109
1993	31	72	109	-78	37	-42	-109	12	32
1994	31	72	109	-130	134	-39	-109	14	82
1995	32	74	112	-160	138	-40	-112	11	55
1996	34	86	111	-170	146	-42	-119	11	57
1997	-4	92	139	-177	153	-44	-124	12	47
1998	39	91	137	-176	152	-44	-123	16	92
1999	38	91	55	-175	76	-18	-63	14	18
2000	39	92	14	-119	65	-18	-21	14	66
2001	41	96	14	-62	26	0	-23	7	99
2002	42	99	15	0	27	-11	-45	3	130
2003	43	101	15	0	28	-10	-46	3	134
2004	45	105	0	0	29	-10	-48	8	129
2005	47	110	0	0	30	-10	-52	11	136
2006	50	117	0	0	32	-11	-79	6	115
2007	53	125	0	0	35	-12	-57	6	150
total	240	1 538	829	-1 273	1 141	-405	-1 195	148	1 023

Source: Own Calculations

Obviously, the models provide very different results. However, this has been expected as mentioned above: the models include different horizons,

use different definitions of costs, and follow different methodology. Nevertheless, some results hold across the models, including both costs and benefits of the transformation, and also distribution of the results in time. A comparison is offered in Table 7 and discussion of the similar aspects is included below. In the table, short-term costs are those related to the changes of EBRD indices with a negative estimated impact of the reforms on the growth rate of the economy (i.e. absolute value of the summation of the results included in the Tables 3-6, considering only negative values). Similarly, the total costs are those related to the negative impact of levels of the indices. Moreover, the long-term result is derived from the models, including estimates of both positive and negative impact of the transformation.

Table no 7 Transformation Results: Comparison of Models

In Billion CZK	Short-term costs	Total costs	Long-term result	Relative result
Trend Analysis		3 3180	+2 745	+1.89 p.p.
Babecký and Havránek (2013)	134		+1 668	+1.47 p.p.
Lawson and Wang (2004)	969	3 369		
Staehr (2005)	289	484	+3 719	
Radulescu and Barlow (2002)	596	3 314	+1 023	

Source: Own Calculations

The *starting costs of transformation* in year 1991 are distinctively higher than the costs in other years. Based on the model, these costs range between 93-753 billion CZK, which is the majority of the short-term costs, and simultaneously around 20-40% of all costs related to transformation, depending on the model.

Price liberalization took place very quickly at the beginning of the transformation (mostly at the beginning of 1991), which was reflected by the jump of the index value from 1 in 1990 to 4 in 1994. Total costs related to this jump are estimated in the range 352-486 billion CZK, which is 65-82% of all costs in 1991. However, in following years, costs related to the price liberalization are minimal, and the positive impact prevails.

External liberalization is, according to all models, definitely the most positive field of transformation, with the positive impact estimated during the years 1990-2007 to be in total 426-769 billion CZK. The positive impact was partially caused by the quick external liberalization, despite to the costs related

to the unfinished enterprise restructuring – estimated based on Staehr (2005) around 119 billion CZK.

Privatization had ambiguous character. However, the small-scale privatisation is evaluated as more positive (less negative) aspect of the transformation than the large-scale privatisation, which is in some models estimated to bear enormous costs of around 1000 billion CZK. The fact, that the small-scale privatisation was implemented first, is evaluated positively, contributing around 200 billion CZK to the positive results.

Financial sector reform was evaluated as very costly, whereas for the banking sectors it is obvious, but for the sector of non-bank institutions and the securities markets the results are uncertain. The most pessimistic estimations shows the financial sector related losses amounted to almost one billion CZK. The prevailing part of these costs is related to the defaulted loans transferred from assets of the Czech banking sector to the special transformation institutions – Czech Consolidation Agency, Consolidation Bank and Czech Financial Unit (Půlpánová 2010). The total amount of assets entering the consolidation programs is more than 500 billion CZK (adjusted to 2005 prices to ensure comparability), most of them resulting in the loss: the accumulated loss only of the Czech Consolidation Agency and its predecessors during 1996-2007 is estimated at more than 230 billion CZK (ČKA 2008).

Enterprise restructuring and governance can be evaluated, based on the models' results, as rather positive. Significant costs were related to this field of transformation, but also distinct benefits – both mostly in years 1993-1998. Since 1999, the positive impact of the transformation area is assumed to be approximately 30 billion CZK per year.

In contrast, the *Competition policy* was not transformed with positive results. The ending-value of the indicator (3.00) shows the transformation was not completed. Such a result indicates there is still a space for improving the law-enforcement in the area of dominant players on the markets, and reducing the restrictions of entrance into some business fields. The costs related to such incomplete transformation are estimated around 400-500 billion CZK.

The *short-term costs* of transformation, i.e. temporary decrease of the economic growth as a consequence of the reforms, is estimated in the range 104-969, based on the model. Although the range is wide, it can be intuitively expected that the more complex models, evaluating the costs separately for

single transformation fields, can be more precise, which would mean the short-term costs are approaching the upper boundary of the interval.

The *total transformation costs* are distinctively higher, mostly due to the overall decrease of the economic growth rate during the first half of the observed period. The long-term costs can be identified predominantly in the areas of large-scale privatisation, competition policy and the banking sector reforms, which were described above. The total amount of costs in absolute values are similar across the models: 3300-3400 billion CZK, in 2005 prices, which is approximately 7.5% of the total GDP for the period.

The *net transformation result* is estimated by all the models, which include both costs and benefits, as positive. The absolute value varies depending on the model, ranging between 1023-3700 billion CZK. Moreover, the long-term positive contribution of the transformation to the growth rate of GDP is explicitly calculated in two models, reaching either +1.47 p.p. or +1.89 p.p.

5. CONCLUSION

The aim of the paper was to estimate the costs and benefits of the economic transformation in the Czech Republic. Although the transformation process itself, as well as a discussion of the optimal transformation methods are frequent in the literature, this paper offers a new view: it identifies the costs and benefits of the transformation in terms of the gross domestic product lost or gained as a consequence of the transformation reforms. The paper describes econometric estimates of the relationship between the economic growth and the transformation reforms as they exist in the literature, and applies them on the Czech transformation to obtain the quantitative results of the transformation in terms of GDP lost or gained, both in the relative and absolute values. As compared to the commonly used accounting approach, the presented macroeconomic approach is able to capture the economic consequences of the transformation in the full extent.

The paper confirms the general fact that the transformation reforms are related to costs in the short horizon, but from the long-term perspective, their impact is positive. In the case of the Czech Republic, most of the costs are related to the first ten years of the transformation, whereas the total share of

costs amounts to approximately 7.5% of the Czech GDP created in 1990-2007. In absolute values (in prices 2005), the costs are at the level 3300-3400 billion CZK. A significant part of these costs (20-40%) are related to the first year of transformation, mostly due to the jump price liberalization. The permanent contribution of the transformation is evaluated as the additional economy growth rate by 1.5-1.9 p.p. per year.

Focusing on the transformation fields, the most positive appears to be the external liberalization, with the positive impact of hundred billion CZK. Mostly the fast speed of opening the economy was helpful, even though it was not supported by an equally fast enterprise restructuring (costs for this improper timing are estimated at the level 119 billion CZK). Further, the analysis shows that the small-scale privatisation was related to costs mostly in the first years of the transformation, whereas since the second half of the first decade, the positive results became larger than the costs. Contrary to this, the large-scale privatisation resulted in much higher costs (around 1000 billion CZK), related mostly to the second half of the decade, but also to the years after 2000. Related to the privatization, the enterprise restructuring was costly in years 1993-1998, but until the end of the century, the reforms were mostly finished and since then, the positive impact also began toaccumulate in this field (contributing approximately 1 p.p. yearly to the GDP). On the other hand, another area related to the privatization, building the competition policy, was not very successful according to the EBRD studies – the total costs related to this area is estimated at around 400-500 billion CZK. An important part of the costs, almost 30% and on average 2% of the GDP in the period, is related to the financial system reforms, particularly the consolidation programmes in the banking sector, which was evaluated to have generated losses of hundreds of billions CZK.

The absolute values of costs and benefits, as well as the relative impact of the reforms on the economic growth rate, are necessary to evaluate in the context of the high volatility of results across different models. Nevertheless, the depicted values might illustrate the levels in which the transformation costs can be expected, and how long a period is necessary for the positive impact to outweigh the reform-related losses. Simultaneously, the paper differentiates the transformation fields related to the extremely high transformation costs, and those areas related to the significantly positive impact on the economy.

However, for a deeper examination of the costs and benefits of the transformation, the whole process needs to be examined in greater detail, able to offer insight into some aspect beyond the econometric analyses of the time series – especially to identify the role of monetary and fiscal policy in the transformation process, as well as their interaction, or to evaluate the impact of the transformation on the microeconomic level.

ACKNOWLEDGEMENT

The authors are grateful to the Czech Enterprise Institute for the financial support during writing the first version of the paper, and particularly to Tomáš Munzi for his helpful comments. Equal thanks are given to all others supporting authors during their research.

REFERENCES

- Babecký, J. and T. Havránek. 2013. Structural Reforms and Economic Growth: A Meta-Analysis. *Czech National Bank*, Working Paper Series 8/2013. Prague, 2013.
- Bolt, J. and J. L. van Zanden. 2013. The First Update of the Maddison Project. *Re-Estimating Growth Before 1820.* [On-line]. Maddison Project Working Paper 4. [Quoted 22-10-2014]. Available at: http://www.ggdc.net/maddison/maddison-project/home.htm.
- Čermák, V. 2000. Česká cesta privatizace a selhání bank. Případová studie ČKD Praha Holding, a.s., In *Oeconomica*, no. 2/2000, Prague, Karolinum, 2001, pp. 79-104.
- ČKA. 2008. *Výroční zpráva 2007 - Česká konsolidační agentura*. Prague: Ministry of Finance of the Czech Republic, Prepared on: 28.06.2008.
- Dvořák, V. 1997. Privatizace českých bank a zhodnocení postupu IPB. In *Oeconomica*, no. 1/1997.
- EBRD (European Bank for Reconstruction and Development). 2000. *Transition report 2000: Employment, skills and transition*. London, 2000. - 238 s. ISBN 1 898802 17 3.

- EBRD (European Bank for Reconstruction and Development). 2001. *Transition report 2001: Energy in transition.* London, 2001. - 222 s. ISBN 1 898802 19 X.
- EBRD (European Bank for Reconstruction and Development). 2002. *Transition report 2001: Agriculture and rural transition*. London, 2002. - 226 s. ISBN 1 898802 21 1.
- EBRD (European Bank for Reconstruction and Development). 2007. *Transition report 2007: people in transition. London*, 2007. - 216 s. ISBN 978-1-898802-29-7.
- EBRD (European Bank for Reconstruction and Development). 2014. *FORECASTS, MACRO DATA, TRANSITION INDICATORS.* [On-line, last update 18-09-2014; Quoted 23-10-2014]. Available at: http://www.ebrd.com/pages/research/economics/data/macro.shtml#ti.
- Fosu, A. K. 2013. *Development Success: Historical Accounts from More Advanced Countries*. Oxford: Oxford University Press. United Nations University World Institute for Development Economics Research, 2013.
- Hanousek, J. and L. Krkoška. 1997. Price liberalization in the Czech Republic: shock therapy versus gradualism. *Prague Economic Papers* 3/1997.
- Kreuzbergová, E. 2003. *Invisible Industrial Policy in the Czech Republic*. Master Thesis, IES FSV UK, Prague.
- Kolodko, G.W. and D. M. Nuti. 1997. *The Polish Alternative: Old myths, Hard Facts and New Strategies in the Successful Transformation of the Polish Economy*. UNU World Institute for Development Economics Research, Helsinki, Finland.
- Lawson, C. and H. Wang. 2004. *Economic transition in Central and Eastern Europe and the former Soviet Union: Which policies worked?* Working Paper. University of Bath, Bath, UK. 2004.
- Mertlík, P. 1998. *Privatization and Restructuralization of Czech Industry in the Economic Transition.* Dissertation Thesis, IES FSV UK, Prague.
- MF (Ministry of Finance of the Czech Republic). 2005. Analýza transformačních nákladů v letech 1991 – 2005. Available at: http://www.mfcr.cz/cs/verejny-sektor/monitoring/transformacni-naklady-v-cr.
- Neprašová, M. 2000. Česká cesta privatizace a její následky. Případová studie Škoda, a.s.“ In *Oeconomica*, no. 2/2000, Prague, Karolinum, 2001, pp. 105-123.

- Radulescu, R. and D. Barlow. 2002. The relationship between policies and growth in transition countries. *The Economics of Transition*, 10(3), pp. 719–745.
- Pickel, A. 1992. Jump-starting a market economy: A critique of the radical strategy for economic reform in light of the East German experience. *Studies in Comparative Communism*, 25(2): pp. 177-191.
- Půlpánová, S. 2010. Komerční bankovnictví v České republice. The University of Economics in Prague, *Oeconomica*. Prague.
- Staehr, K. 2005. Reforms and Economic Growth in Transition Economies: Complementarity, Sequencing and Speed. *European Journal of Comparative Economics* 2, no. 2, pp. 177–202.
- Stanley, T. D. 2001. Wheat from Chaff: Meta-analysis as Quantitative Literature Review. *Journal of Economic Perspectives*, 15(3), pp. 131–150.